

# Status, Abundance, and Colony Distribution of Breeding Pigeon Guillemots (*Cepphus columba*) from the Inland Marine Waters of Washington State, as Documented by PSAMP Efforts, 2000-2002

Joseph R. Evenson, David R. Nysewander, Thomas A. Cyra and Bryan L. Murphie

*Washington State Department of Fish and Wildlife*

Mary Mahaffy

*U.S. Fish and Wildlife Service*

[Editor's note: Figures for Evenson *et al* appear at the end of this document.]

## Abstract

The pigeon guillemot is the most widely distributed of the alcids that breed within the inner marine waters of Washington State. The Washington Department of Fish and Wildlife (WDFW) and U.S. Fish and Wildlife Service (USFWS) conducted comparable censuses of guillemot colonies in May 2000 – 2002 to assess their status and population trends in the region. Counts, limited to 3.25 hours after sunrise of any given day, were made from boats at the 120 colonies listed in the Catalog of Washington Seabird Colonies (Speich and Wahl 1989), and at over 350 other colonies not previously documented; these counts covered all the known guillemot colonies within the inner marine waters of Washington. All colonies were counted regardless of colony size, with replicates on at least 2-3 different days. Complete counts of all colonies were made from 2000 – 2002, and at new colonies each year as they were discovered (guillemots would at times establish new colonies). For comparing yearly trends, colonies were stratified into localized areas to limit the bias of birds shifting between colonies between years. The maximal total count of breeding guillemots throughout the region ranged from 14,546 to 15,426 from 2000-2002. Habitat types at each colony were documented to assess their importance to breeding guillemots; the sand/clay bluffs were those prominently used.

## Objectives

The primary objective of this project was to develop, and implement, a study to assess the status and population trends of the pigeon guillemot in Washington's inland marine waters.

Scientists with WDFW have monitored the pigeon guillemot in Puget Sound during the Puget Sound Ambient Monitoring Program (PSAMP) summer aerial surveys (WDFW monitoring and assessment of marine bird population indices) from 1992 to 1999. When comparing the densities from the PSAMP surveys with the Marine Ecosystem Analysis (MESA) aerial surveys of 1978-79 (National Oceanic and Atmospheric Administration (NOAA) and U.S. Environmental Protection Agency (EPA) two-year assessment of marine bird distribution and abundance of the northern Puget Sound), a clear trend has been difficult to assess due to high confidence limits. The high C.L. reflects the ineffectiveness of the aerial survey method for monitoring guillemots.

To obtain a clearer picture of pigeon guillemot population trends in Puget Sound, a breeding colony census was started in 1999, then expanded and standardized between 2000 and 2002. These data represent the middle three years, of a five-year study, to calculate the mean number of breeding guillemots for this period. The five-year census will be duplicated in the future to compare future means with these baseline data. The secondary objective has been to inventory the colony habitats used.

## Methods

Counts occurred during May and June 1999, and April 2000, with special emphasis to search for colonies not listed in the *Catalog of Washington Seabird Colonies*. The count data reported in this study comprised all counts during 2000 – 2002. Counts were conducted by vessel from 0.25 hours to 3.25 hours after sunrise, at sea states of  $\leq$  Beaufort 3. Counts were limited to the month of May, with an average of 3 counts at each colony per year. In addition, new colonies were searched for while conducting census routes, as guillemots at times establish new colonies close to existing adjacent colonies. Habitat information was also documented for each colony site. The region was stratified into sub-regions determined by geographical and hydrographic features (Figure 1).

## Results

Figure 2 shows the locations and respective size of the 471 pigeon guillemot colonies counted in the inland marine waters of Washington State. The sum of yearly maximal counts of breeding guillemots ranged from 14,546 to 15,426 from 2000-2002, with a mean yearly maximal count of 14,879,  $\pm$  936 (95% C.L.) (Figure 3). The San Juan Islands and Southeastern Strait of Juan de Fuca sub-regions were the most populous, with mean yearly populations of 3,919 and 3,351, respectively.

Figure 4 illustrates the yearly maximal counts, and mean yearly mean maximal count, by sub-region. Variation in sub-regional yearly counts ranged from 5% to 153%. The highest variation occurred in the Strait of Georgia and the Western Strait of Georgia, with 150% and 153%, respectively. This is the result of both low numbers of guillemots in the sub-regions, and the difficulty in counting Tatoosh Island. The Admiralty Inlet sub-region had the lowest variation of 5%.

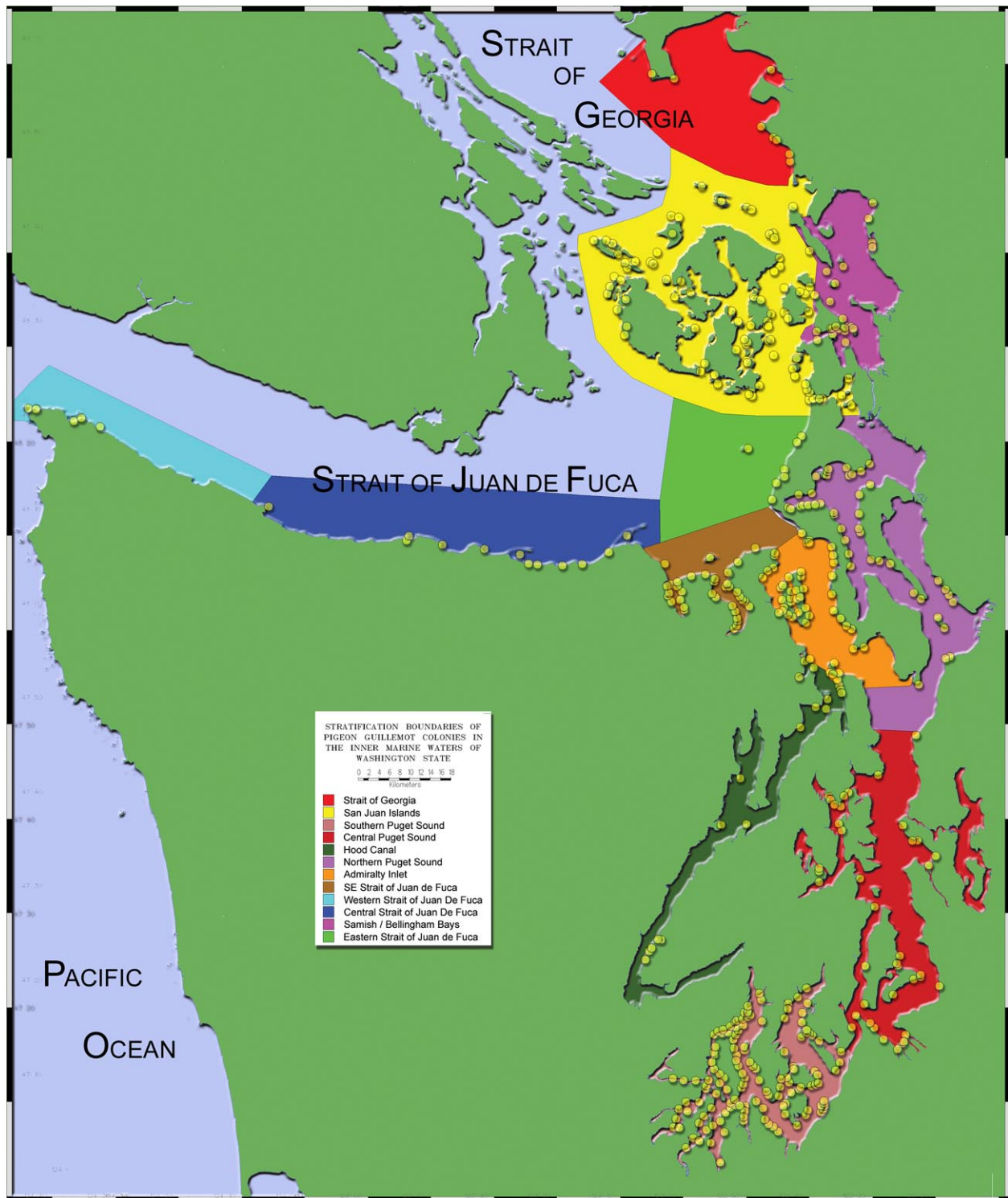
Mean sub-regional colony size ranged from 1 to 90 guillemots. The Western Strait of Georgia had the smallest yearly mean maximal number guillemots with 1 bird per colony, while the Southeastern Strait of Juan de Fuca had the largest with 90 birds per colony. The average yearly mean maximal colony size region-wide was 32 guillemots per colony (Figure 5).

Sand/clay bluffs were the most prominent habitat type comprising 63% (262 colonies, 8,593 guillemots) of the mean yearly maximal counts (Figure 6 & 7). All rocky habitats combined (rocks, & rock cliffs) together comprised 21% of the mean yearly maximal counts (98 colonies, 4,535 guillemots).

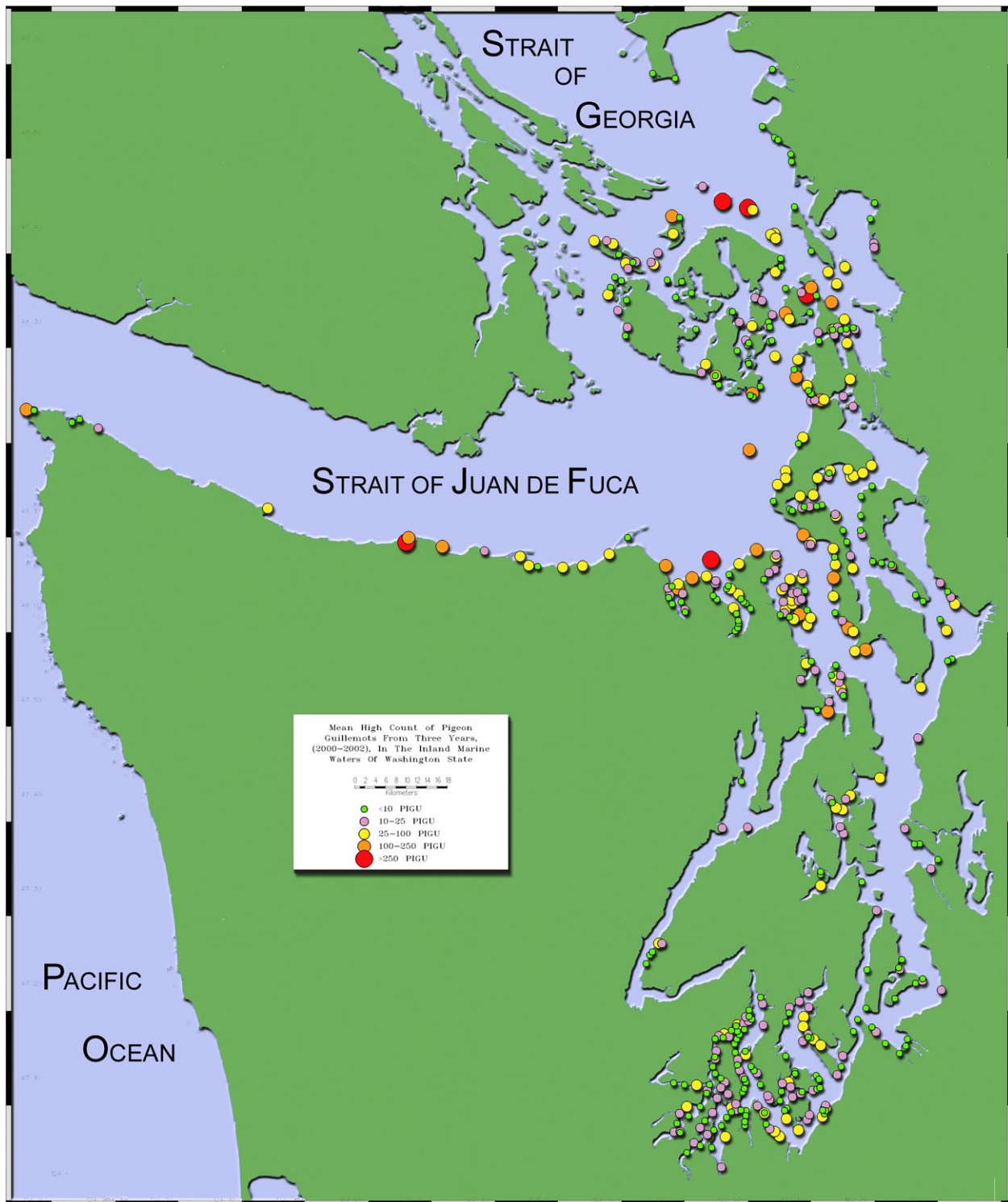
## Acknowledgements

We are greatly indebted to the following people, and respective agencies and organizations, for their selfless and untiring efforts in conducting guillemot colony counts; without their efforts this project would not have been possible. N. Seto of United States Fish & Wildlife Service (USFWS), Nisqually National Wildlife Refuge Complex Office. U. Wilson of USFWS, Washington Maritime Wildlife Refuge Complex Office. T. Abrams, D. Brock, J. Brook Brookshier, R. Caniff, B. Charity, E. Cummins, M. Davison, P. Dowty, K. Dyer, B. Evenson, M. Evenson, D. Huddle, B. Johnson, G. Johnson, D. Kreege, K. McCallister, R. Milner, L. Nysewander, and G. Schirato (staff and volunteers of the Washington Department of Fish & Wildlife). K. Aitkin, P. Bakke, Berge, S. Burgdorf, D. Butler, P. Cagney, R. Carlson, Chaffee, S. Craig, K. Cushman, Y. Dettlaf, S. Dilley, Gillman, J. Gilstrom, J. Grettenberger, I. Grettenberger, S. Hagen, Hores, Jensen, J. Kely, Kingers, J. Krausman, S. Lamar, D. Lantz, C. Levy, D. Lynch, F. Mejia, K. Myers, K. Owens, R. Peters, R. Piaskowski, Pittman, A. Ralph, P. Repp, J. Rock, and P. Walcott of USFWS, Western Washington Office. R. Osborne, J. Calogero, C. Don, E. Eisenhardt, S. Harrington, S. Kessler, K. Koski, C. McAlpine, D. McCutchen, K. Meyer, L. Michaelson, T. Hornung, T. Riley, D. Roberts, L. Robinson, J. Smith, R. Tallman, and A. Traxler of the Whale Museum (under contract to USFWS). We apologize for any who might be left off this list.

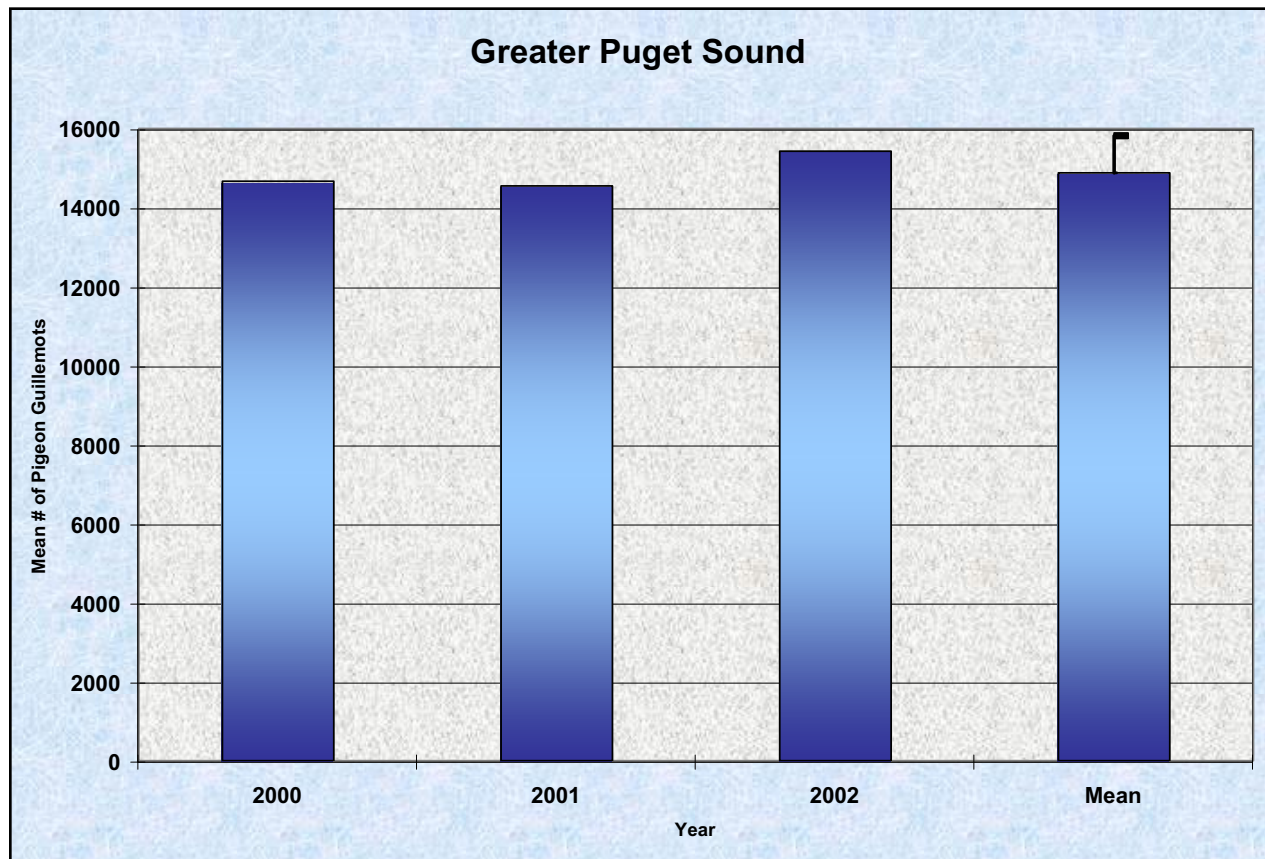
## Figures



**Figure 1.** Sub-regional stratification of pigeon guillemot breeding colonies within the inland marine waters of Washington State.



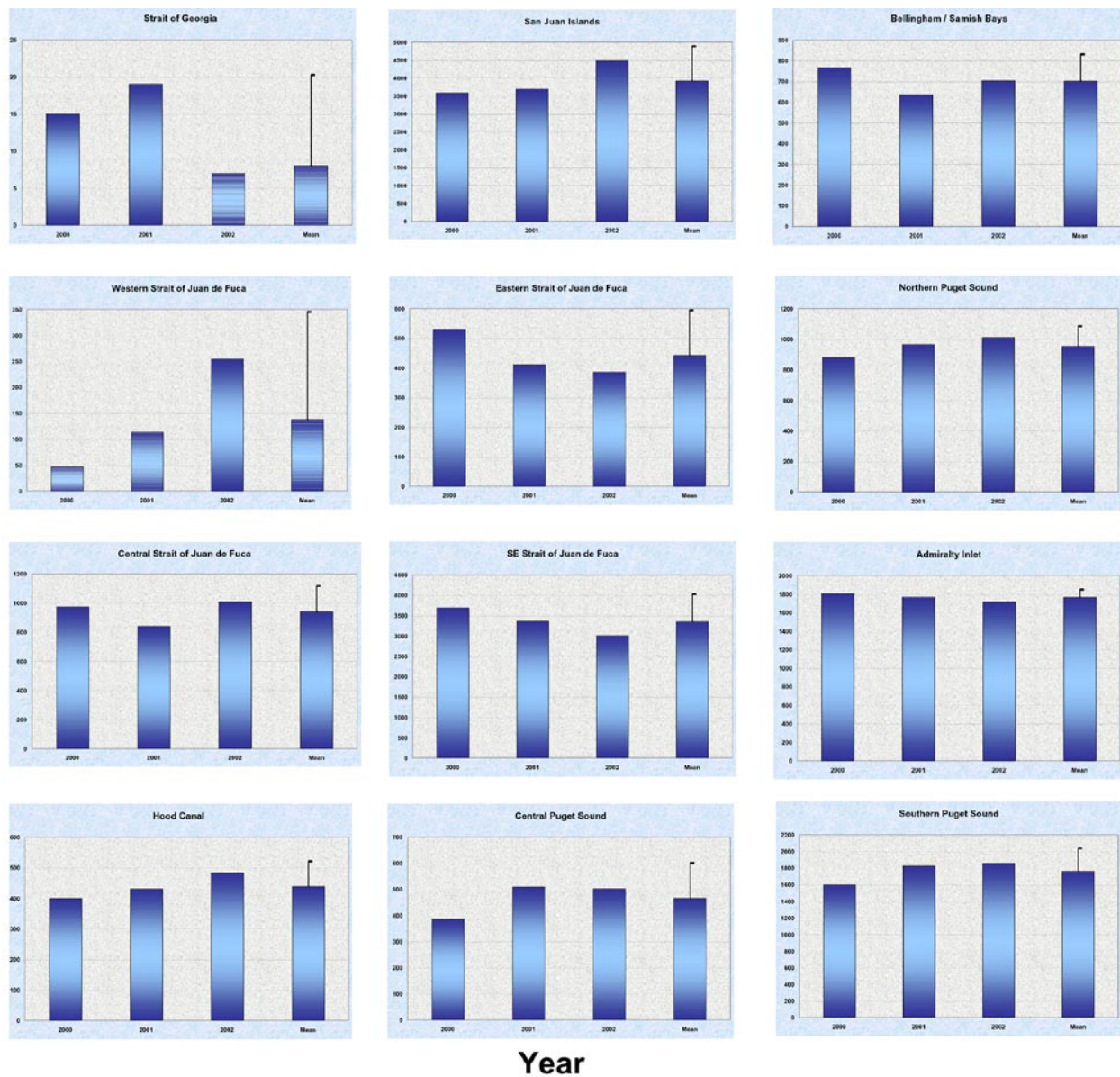
**Figure 2.** Locations of pigeon guillemot breeding colonies within the inland marine waters of Washington State. Size and color of dots represent the respective mean maximal size between 2000 and 2002.



**Figure 3.** Comparison of the sum of maximal counts of pigeon guillemots from all colonies from 2000-2002, by year. The three year mean with 95% C.L. is displayed.



Total Number of Pigeon Guillemots



**Figure 4.** Comparison of the sum of maximal counts of pigeon guillemots by year and sub-region from 2000-2002. The three year mean with 95% C.L. is displayed.

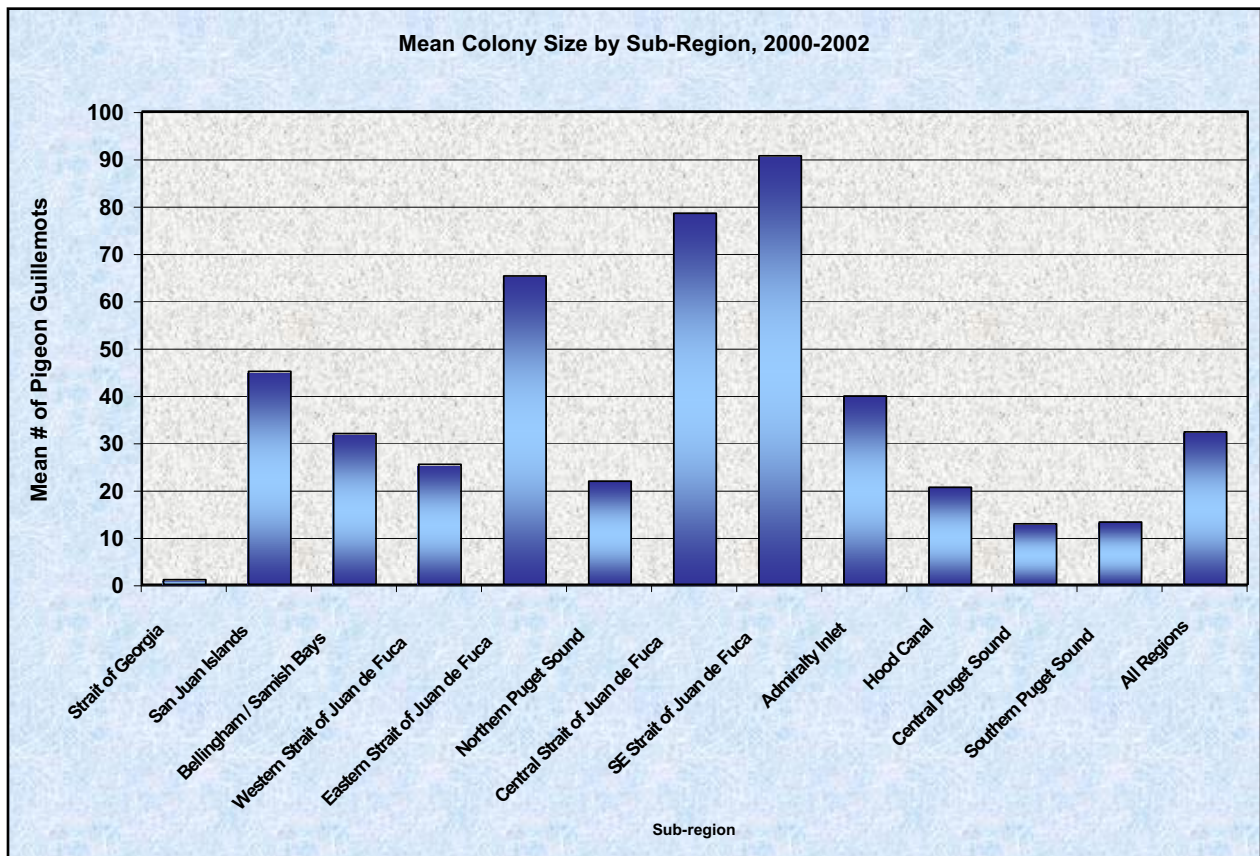


Figure 5. Mean size of pigeon guillemot colonies from 2000-2002, by sub-region.

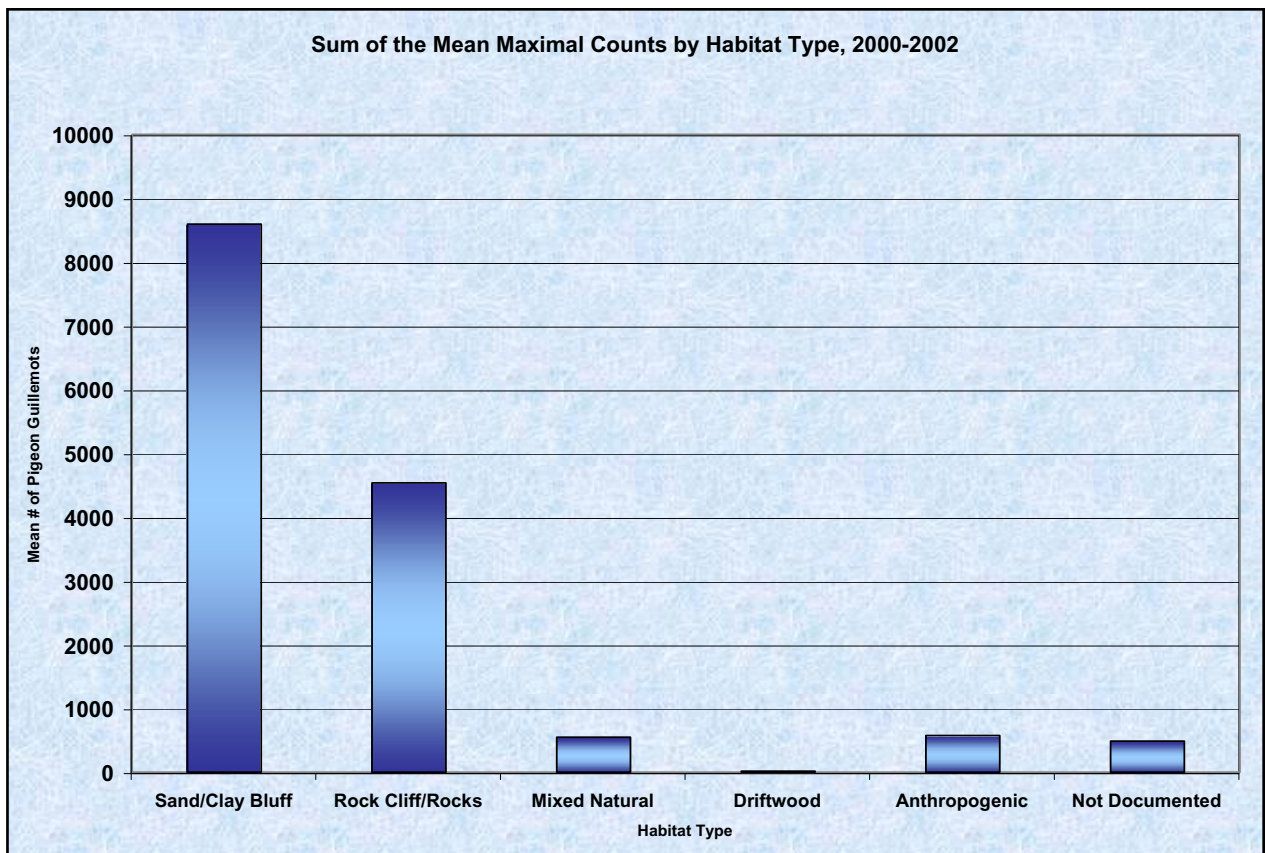
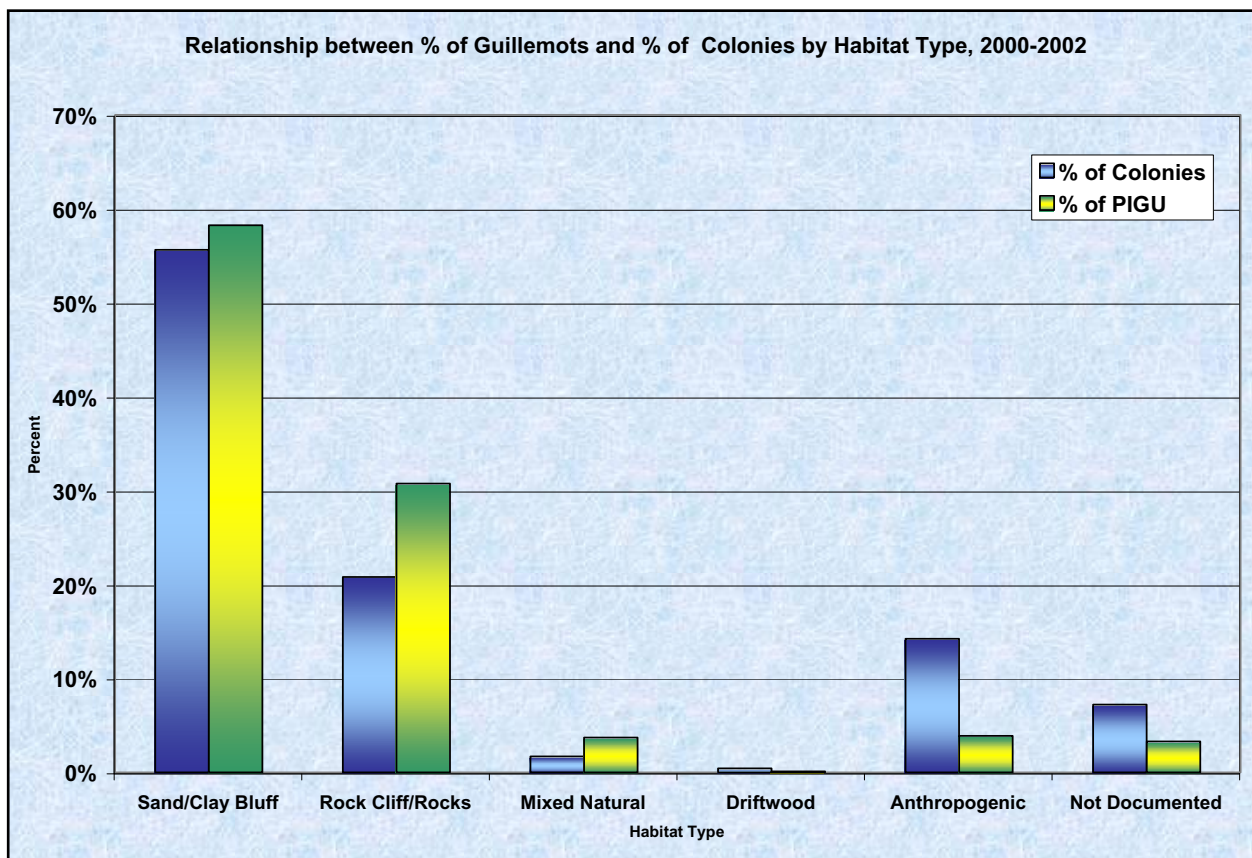


Figure 6. Number of pigeon guillemots utilizing the six types of habitat, 2000-2002.



**Figure 7.** Relationship between the percent of guillemots using, and the percent of colonies within, each habitat type, from 2000-2002.